

# Isotope Fractionation in the Interstellar Medium

Steven Charnley

*Astrochemistry Laboratory, Solar System Exploration Division, Code 691, Science and Exploration Directorate, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA*

Anomalously fractionated isotopic material is found in many primitive Solar System objects, such as meteorites and comets. It is thought, in some cases, to trace interstellar matter that was incorporated into the Solar Nebula without undergoing significant processing. We will present the results of models of the nitrogen, oxygen, and carbon fractionation chemistry in dense molecular clouds, particularly in cores where substantial freeze-out of molecules on to dust has occurred. The range of fractionation ratios expected in different interstellar molecules will be discussed and compared to the ratios measured in molecular clouds, comets and meteoritic material. These models make several predictions that can be tested in the near future by molecular line observations, particularly with ALMA.